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[54] **PINBALL MACHINE WITH MOVABLE BALL RETRIEVAL TARGET ASSEMBLY**

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[52] **U.S. Cl.** ..... **273/121 A**; 273/121 R; 273/118 R; 273/118 A

[58] **Field of Search** ..... 273/118–125, 273/127 R, 127 B, 127 C, 127 D

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[57] **ABSTRACT**

A pinball machine in which a movable target assembly is provided. The movable target assembly retrieves and seemingly devours the pinball sending the ball to another part of the playfield where it is either put back into play or is removed from action and placed in the ball reservoir. In playing the pinball game, the player attempts to place the ball in a target within reach of the movable target assembly. The assembly then pivots towards and picks up the ball. The ball is then seemingly swallowed by the movable target assembly, and is sent, through the assembly and under the playfield, back out to a second location on the playfield.

26 Claims, 4 Drawing Sheets

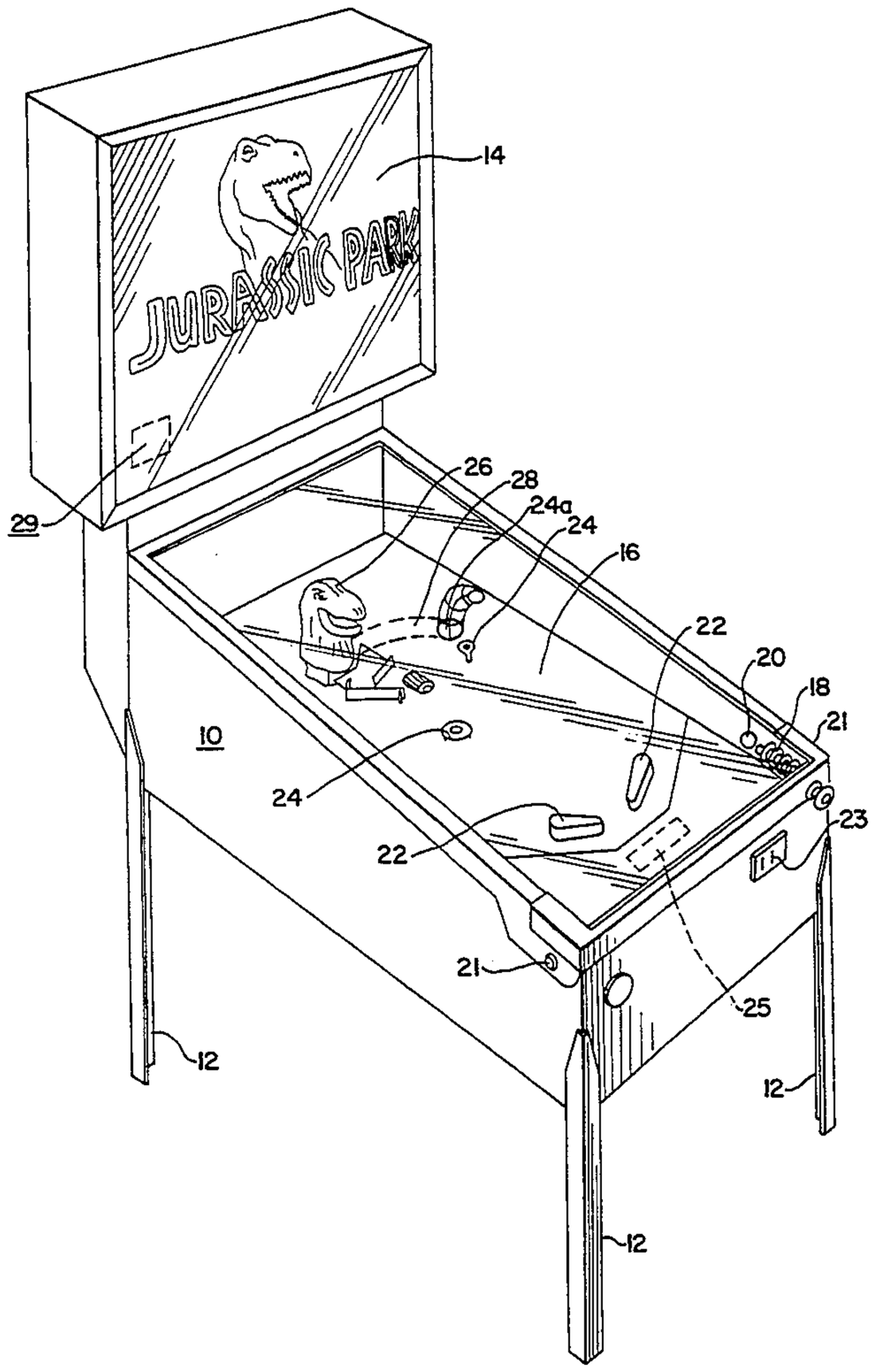

Fig. 1

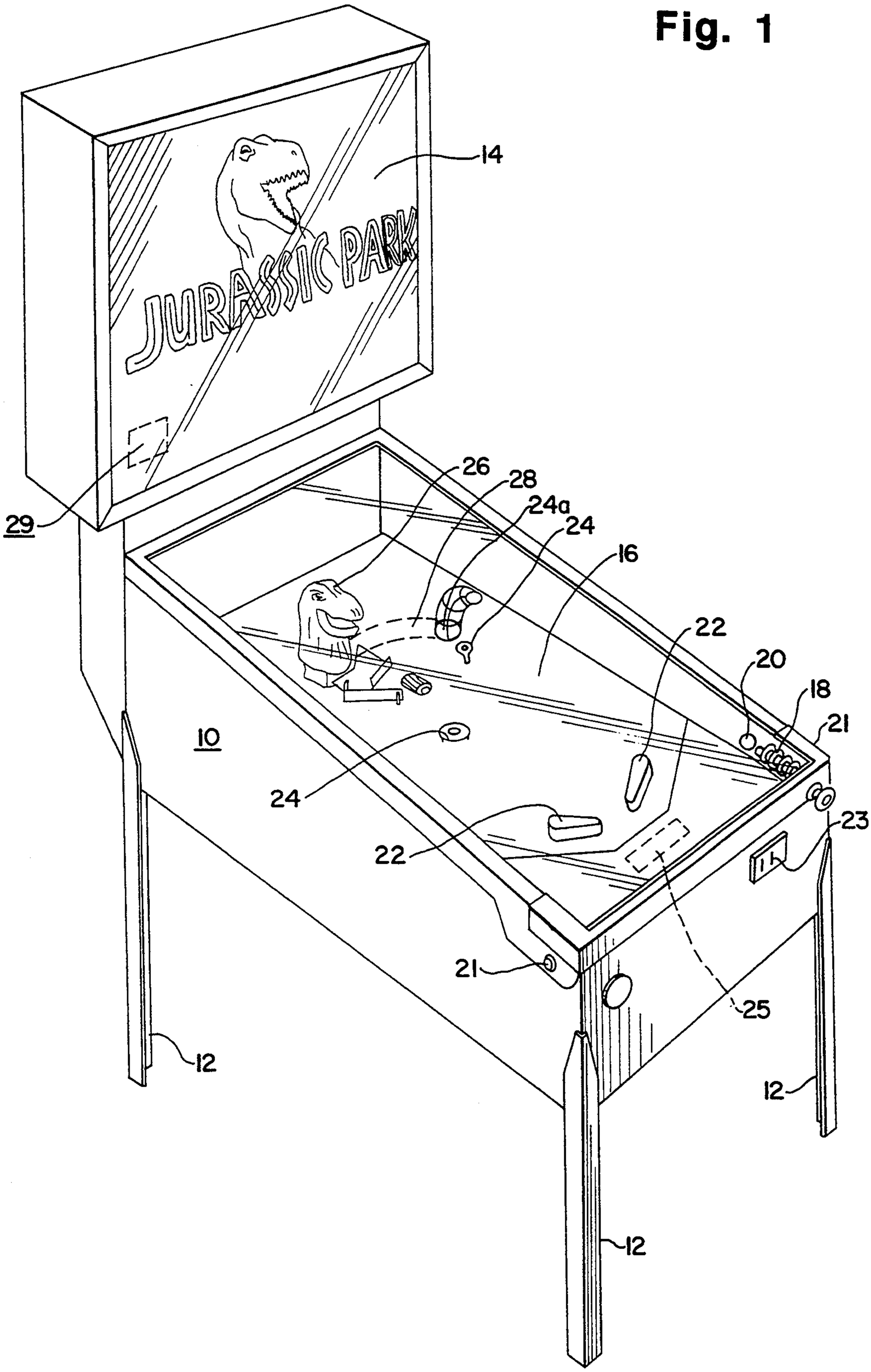
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Fig. 2

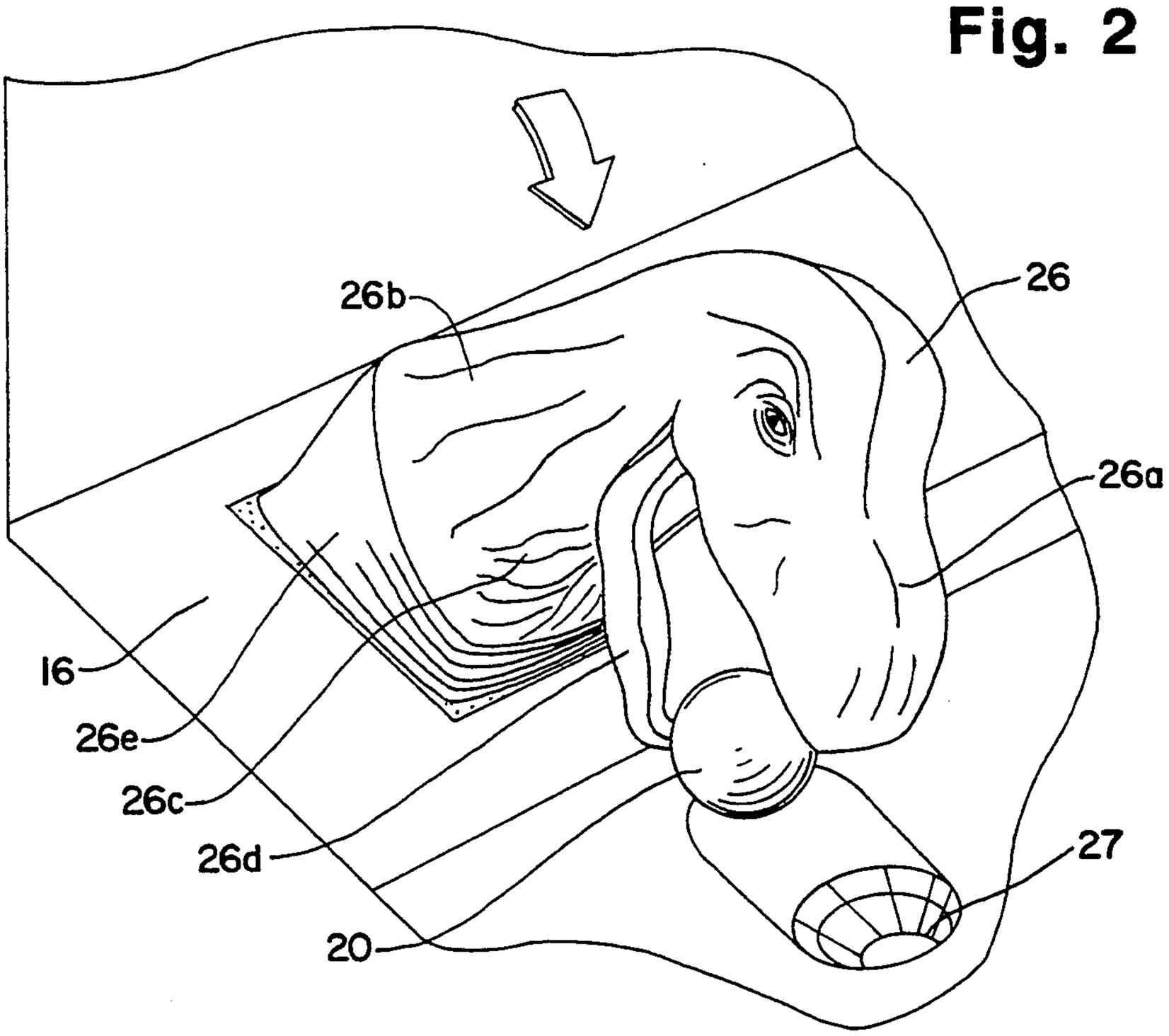


Fig. 3

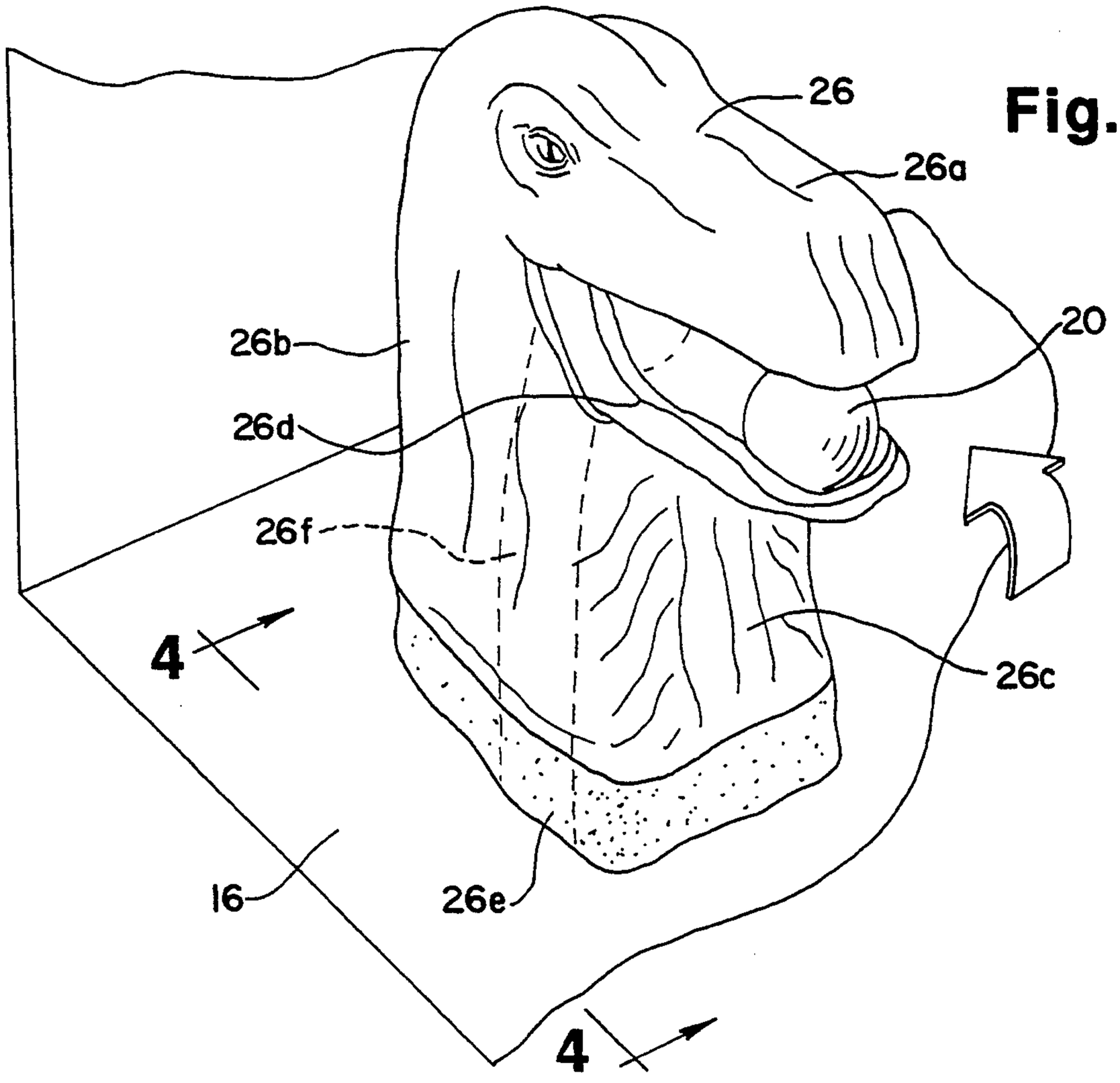


Fig. 4

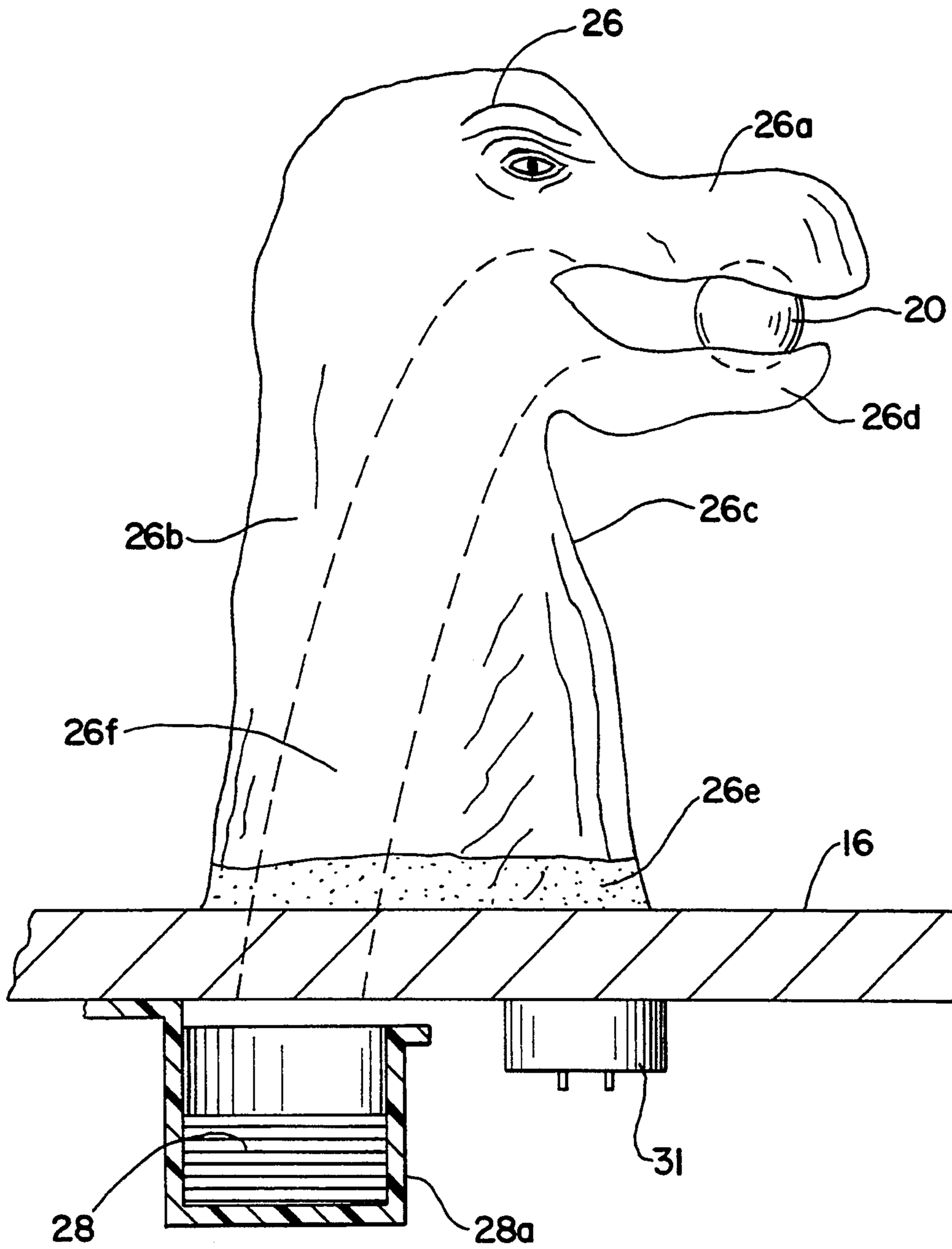
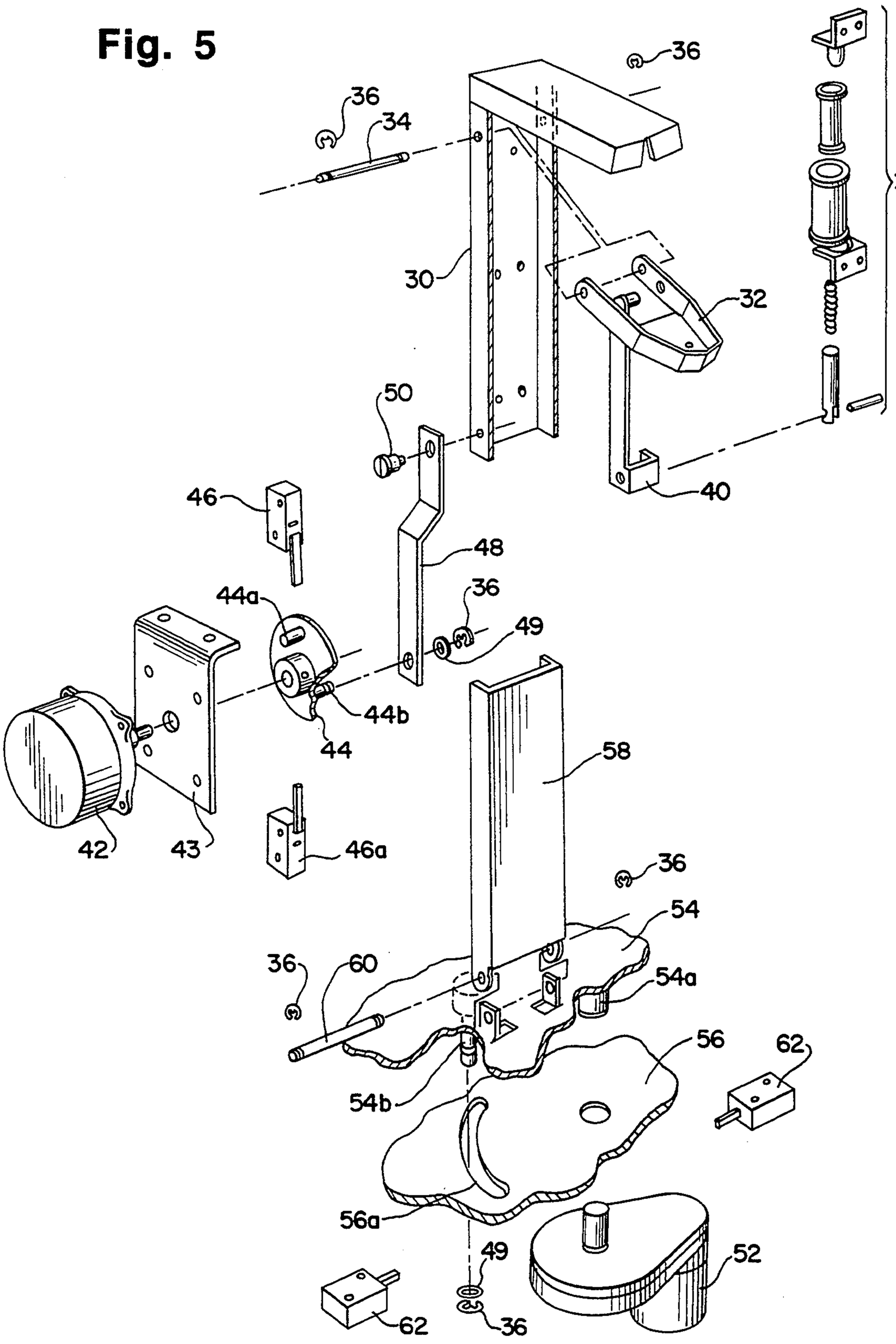


Fig. 5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PINBALL MACHINE WITH MOVABLE BALL RETRIEVAL TARGET ASSEMBLY

FIELD OF THE INVENTION

The present invention concerns a novel pinball machine with a movable ball retrieval target assembly on the playfield.

BACKGROUND OF THE INVENTION

The object of pinball machines is to entertain the player of the game as well as the spectators. Player and spectator interest in pinball machines is short lived in that most pinball machines repeat the same types of play and it does not take long for such repetition to become monotonous. Pinball machine designers are, therefore, always trying to come up with new and varied methods of playing pinball so as to replace those machines that have become monotonous and to increase the life span of new pinball machines. These methods include the use of targets in different and varied manners and the design and construction of different types of targets and target assemblies.

It is therefore an object of the present invention to provide a means for making a pinball game interesting for as long as possible. It is another object of the present invention to provide a target that is entertaining to watch. It is another object of the invention to provide a target assembly on a pinball machine that is easy and economical to construct and use.

Other objects and advantages of the present invention will become apparent as the description proceeds.

SUMMARY OF THE INVENTION

In accordance with the present invention a pinball machine having a housing and a playfield is provided. A motor assembly and a ball retrieval location are also provided and are carried within the housing. A movable ball retrieval assembly is provided in the housing and is movably connected to the motor assembly.

The motor assembly is actuatable to move the ball retrieval assembly on the playfield from a first position to a second position. The ball retrieval assembly retrieves the ball and the motor assembly is actuated to return the ball retrieval assembly to its first position.

In the illustrative embodiment, the ball retrieval assembly is an animal-shaped target assembly resembling a Tyrannosaurus Rex dinosaur. A first motor assembly and a second motor assembly are provided and are carried within the housing. The animal-shaped assembly, comprising an animal-shaped head, with a pivoting lower jaw, an animal neck and an animal body, is provided in the housing and is adapted for retrieving balls. The animal-shaped assembly is rotationally and pivotally connected to the motor assemblies.

The first motor assembly is actuatable to rotate the animal-shaped assembly on the playfield. The second motor assembly is actuatable to pivot the animal-shaped assembly from a first upright position to a second, non-upright, position. The animal-shaped assembly is pivoted so as to bring the assembly proximal to a ball on the playfield. An electromagnet, also provided, is actuatable to open and close the lower jaw of the animal-shaped head to allow the ball to be retrieved by the animal-shaped assembly. The ball, once retrieved, is passed into the animal body and out through various means to the playfield to resume play.

In another embodiment the animal-shaped target assembly retrieves a ball from the playfield and then returns the ball to the same or another location on the playfield. A microcomputer in the pinball machine determines where the ball will be retrieved and released. In the play of that embodiment, a player places the ball within the reach of the animal-shaped assembly and a microcomputer operates the assembly to retrieve the ball and then release the ball in any one of a plurality of locations. Further, the animal-shaped assembly can include a number of ball holding devices, such as a switch, or a plurality of switches, with ball stopping means to keep the ball from rolling out of the animal-shaped assembly. In this way, more than one ball can be retrieved from the playfield and can be held until the microcomputer, or other means, determines that the ball or balls should be released.

A more detailed explanation of the invention is provided in the following description and claims and is illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a pinball machine constructed in accordance with the principles of the present invention.

FIG. **2** is a perspective view of a target system in one position in the pinball machine of FIG. **1**.

FIG. **3** is similar to FIG. **2** showing the target system in another position.

FIG. **4** is a partial cross-sectional elevation, taken along line **4**—**4** of FIG. **3**.

FIG. **5** is a fragmentary view of the inner workings of the target system of the present invention.

DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

Referring to the drawings, FIG. **1** shows a pinball machine comprising a central body **10** attached to a plurality of legs **12**, with a scoreboard **14** and a playfield **16**. A ball launcher **18** is provided to propel a ball **20** onto the playfield **16** where ball **20** can be struck by a plurality of flippers **22** and can strike a plurality of targets **24**. An animal-shaped target system **26** is provided on playfield **16** and is explained in detail below. A path **28** is defined below the playfield **16**, by a "U" shaped-elongated member **28***a*, shown in FIG. **4**, leading from below the animal-shaped target system **26** to another point on playfield **16**. A vertical-up-kick assembly **24***a* may be included to return the ball **20** to the playfield **16** from member **28***a*. In other embodiments of the present invention, the path **28** may lead to a plurality of locations including to the pinball machine ball reservoir **25**. Microcomputer means **29**, flipper control buttons **21** and money accepting means **23** are provided with the pinball machine.

FIGS. **2** and **3** show animal-shaped target system **26** in greater detail. In FIG. **2**, animal-shaped target system **26**, here shaped like a Tyrannosaurus Rex dinosaur, is in a ball retrieval position. A ball **20** is retrieved from a first location, here illustrated as a microcomputer controlled ball ejector target **27**, towards which animal-shaped target system **26** may pivot. Animal-shaped target system **26** is comprised of a head **26***a*, a back **26***b*, a neck **26***c*, a jaw **26***d* and a base **26***e*. When a ball **20** comes to rest in ejector target **27**, microcomputer **29** senses the presence of the ball, actuating animal-shaped target system **26**. In this embodiment, a microcomputer **29** may also cause the activation of ejector target **27**,

ejecting the ball from the animal-shaped target assembly **26** and back into play without causing the animal-shaped target assembly **26** to be actuated.

In FIG. **3** animal-shaped target system **26** is in the upright position with ball **20** held between head **26***a* and jaw **26***d*. From this position, the ball **20** may be caused to do any one of the following: be dropped through the animal-shaped target system **26**, via path **26***f*, to a passage **28** below the playfield **16**; be released onto playfield **16** in a second location; or be released back into the ball ejector target **27**. Normal play may then resume.

FIG. **4** is a cross-sectional elevation taken along line **4**—**4** of FIG. **3**. FIG. **4** shows animal-shaped target system **26** in its upright position after retrieval of ball **20**. It can be seen from FIG. **4** that the ball **20** once having passed through animal-shaped target system **26**, via pathway **26***f*, enters into passage **28** which guides pinball **20** back to vertical-up-kicker **24***a*, where the ball is returned to playfield **16**. First motor **31**, which produces rotational motion in animal-shaped target assembly **26**, is also shown in FIG. **4**.

FIG. **5** shows the inner workings of animal-shaped target assembly **26**. A back-and-head support **30** is rotationally attached to jaw support **32** by rod **34**. "E" rings **36** are provided to keep rod **34** in place. Solenoid assembly **38** is provided attached to jaw **32** through link **40**. Link **40** is rotationally attached to jaw support **32** in such a way that when solenoid assembly **38** is energized and de-energized link **40** causes jaw support **32** to pivot about rod **34**. Jaw support **32** is mechanically attached to jaw **26***d* of animal-shaped target assembly **26**. In this manner, jaw **26***d* is animated and the mouth of animal-shaped target assembly **26** opens and closes.

Electric motor **42** is provided to effect the pivoting of animal-shaped target assembly **26** towards a ball **20**. Motor **42** is rotationally connected to motor cam assembly **44** through mounting bracket **43**. Motor cam assembly **44** comprises legs **44***a* and **44***b*. Switches **46** are provided to limit the degree of pivot allowed and to effect the reversal of the action of motor **42**, restoring the target assembly **26** to an upright position after first being pivoted forward. A crank arm **48** is rotationally attached to cam leg **44***b* by a washer **44** and an "E" ring **36** and is rotationally attached to back and head support **30** by a shoulder screw **50**. In the action of pivoting, microcomputer **29** (see FIG. **1**) activates motor **42** causing motor cam assembly **44** to rotate. As motor cam assembly **44** rotates, cam leg **44***b* causes crank arm **48** to rotate pivoting back-and-head support **30** forwards. In rotating motor cam assembly **44**, leg **44***a* strikes one switch **46** upon causing a complete pivot and causes switch **46** to stop motor **42**. Microcomputer **29** later causes motor **42** to reverse direction causing the reverse effect and pivoting the target assembly **26** to its first upright position. In this manner, target assembly **26** is pivoted forward towards playfield **16** and backwards to its first upright position. Another switch **46** is provided to stop the target assembly **26** from pivoting too far back. This pivoting action in concert with the previously described jaw movements, effects the recovery and devouring of the ball as described above.

Motor assembly **52** is provided to allow the target assembly **26** to rotate about its vertical axis. Motor assembly **52** is rotationally attached to upper mounting plate assembly **54** at coupling member **54***a* through lower mounting plate **56**. A slot **56***a* defined in lower mounting plate **56** receives guide member **54***b* which is rigidly attached to upper mounting assembly **54**. Guide member **54***b* is held to lower mounting plate **56** by a washer **49** and an "E" ring **36**. Front support plate **58** is pivotally attached to upper mounting assembly **54** by rod **60** and "E" rings **36**.

In the rotation of the target assembly **26**, microcomputer **29** randomly activates motor assembly **52**. Upper mounting assembly **54** is rotated about coupling member **54***a* by motor assembly **52**. Slot **56***a* and switches **62** determine the degree of rotation and reverse the action of motor assembly **52** in a manner similar to that describe above with respect to the pivoting of the target assembly **26**.

The inner workings shown if FIG. **5** are disposed within the target assembly **26** and beneath playfield **16** in such a manner as to cause the required effect and to remain hidden from the player's and spectators' view.

Although an illustrative embodiment of the invention has been shown and described, it is to be understood that various modifications and substitutions may be made by those skilled in the art without departing from the novel spirit and scope of the invention.

What is claimed is:

1. A pinball machine which comprises:
a housing which carries a playfield;
a motor assembly within said housing;
a ball detecting sensor;
at least one ball retrieval location;
a movable ball retrieval assembly, within said playfield housing, said ball retrieval assembly being movably connected to said motor assembly;
said motor assembly being responsive to said ball detecting sensor to move said ball retrieval assembly from a first position to said ball retrieval location to retrieve a stationary ball, and being operable to return said ball retrieval assembly to said first position.

2. The pinball machine of claim **1**, wherein said ball retrieval assembly defines an opening whereby said retrieved ball is passed through said ball retrieval assembly and under said playfield.

3. The pinball machine of claim **1**, wherein a microcomputer is provided to operate said ball retrieval assembly.

4. The pinball machine of claim **1**, wherein said ball retrieval assembly has a cover which resembles at least a portion of an animal.

5. The pinball machine of claim **1**, wherein said ball retrieval assembly resembles at least a portion of a Tyrannosaurus Rex dinosaur.

6. The pinball machine of claim **1**, wherein said ball retrieval assembly has a cover which resembles at least a portion of an animal, rests upright and generally perpendicular to the plane of said playfield, and comprises a mouth, with a moveable lower jaw, into which a ball is retrieved when said ball retrieval assembly is first moved toward a generally parallel position with respect to said playfield and then moved back to said first upright position.

7. The pinball machine of claim **1**, wherein said ball retrieval assembly comprises means for holding a ball.

8. The pinball machine of claim **1**, wherein said ball retrieval assembly comprises means for retrieving and holding a plurality of balls.

9. The pinball machine of claim **1**, wherein said ball retrieval assembly comprises means to retrieve the ball from a first location on said playfield, hold said ball, and then release said ball at a second location on said playfield.

10. The pinball machine of claim 1, wherein said ball retrieval assembly is pivotally connected to said motor assembly and said ball retrieval assembly pivots from said first position to said ball retrieval location.

11. A pinball machine which comprises:
a housing which carries a playfield;
a motor assembly within said housing;
a second motor assembly within said housing;
a ball detecting sensor;
at least one ball retrieval location;
a movable ball retrieval assembly, within said playfield housing, said ball retrieval assembly being movably connected to said motor assembly; said motor assembly being responsive to said ball detecting sensor to move said ball retrieval assembly from a first position to said ball retrieval location to retrieve a ball, and being operable to return said ball retrieval assembly to said first position; and
said ball retrieval assembly comprising a vertical axis and said second motor assembly being movably connected to rotate said ball retrieval assembly about said vertical axis.

12. A pinball machine which comprises:
a housing carrying a playfield;
a motor assembly within said housing;
a ball detecting sensor;
a ball retrieval assembly, comprising a cover resembling at least a portion of an animal, having a moveable lower jaw for retrieving balls within said playfield housing, said ball retrieval assembly being pivotally connected through said playfield to said motor assembly;
said motor assembly being responsive to said ball detecting sensor to pivot said ball retrieval assembly from an upright position to a non-upright position proximal to a ball on said playfield and to return said ball retrieval assembly to said upright position;
said ball retrieval assembly being operable to open and close said moveable lower jaw to retrieve said ball from said playfield as said ball retrieval assembly is pivoted to said non-upright position.

13. The pinball machine of claim 12, wherein said ball retrieval assembly defines an opening whereby said retrieved ball is passed through said ball retrieval assembly and under said playfield.

14. The pinball machine of claim 12, wherein a microcomputer is provided to operate said ball retrieval assembly.

15. The pinball machine of claim 12, wherein said ball retrieval assembly resembles at least a portion of a Tyrannosaurus Rex dinosaur.

16. The pinball machine of claim 12, wherein said ball retrieval assembly comprises means for holding a ball.

17. The pinball machine of claim 12, wherein said ball retrieval assembly comprises means for retrieving and holding a plurality of balls.

18. The pinball machine of claim 12, wherein said ball retrieval assembly comprises means to retrieve the ball from a first location on said playfield, hold said ball, and then release said ball at a second location on said playfield.

19. A pinball machine which comprises:
a housing carrying a playfield;
a motor assembly within said housing;
a second motor assembly within said housing;
a ball detecting sensor;
a ball retrieval assembly, comprising a cover resembling at least a portion of an animal, having a moveable lower jaw for retrieving balls within said playfield housing, said ball retrieval assembly being pivotally connected through said playfield to said motor assembly;
said motor assembly being responsive to said ball detecting sensor to pivot said ball retrieval assembly from an upright position to a non-upright position proximal to a ball on said playfield and to return said ball retrieval assembly to said upright position;
said ball retrieval assembly being operable to open and close said moveable lower jaw to retrieve said ball from said playfield as said ball retrieval assembly is pivoted to said non-upright position; and
said ball retrieval assembly comprising a vertical axis and said second motor assembly being movably connected to rotate said ball retrieval assembly about said vertical axis.

20. A pinball machine which comprises:
a housing carrying a playfield;
a ball detecting sensor;
a first motor assembly within said housing;
a second motor assembly within said housing;
an electromagnet assembly within said housing;
a ball retrieval assembly, comprising a cover resembling at least a portion of an animal, having a pivoting lower jaw adapted for retrieving balls, within said playfield housing, said ball retrieval assembly being rotationally connected to said first motor assembly and pivotally connected to said second motor assembly;
said first motor assembly being responsive to said ball detecting sensor to rotate said ball retrieval assembly on said playfield;
said second motor assembly being operable to pivot said ball retrieval assembly from an upright position to a non-upright position proximal to a ball on said playfield and to return said ball retrieval assembly to said upright position;
said electromagnet assembly being operable to open and close said moveable lower jaw to retrieve said ball from said playfield upon said ball retrieval assembly being first pivoted.

21. The pinball machine of claim 20, wherein said ball retrieval assembly defines an opening whereby said retrieved ball is passed through said ball retrieval assembly and under said playfield.

22. The pinball machine of claim 20, wherein a microcomputer is provided to operate said ball retrieval assembly.

23. The pinball machine of claim 20, wherein said ball retrieval assembly resembles at least a portion of a Tyrannosaurus Rex dinosaur.

24. The pinball machine of claim 20, wherein said ball retrieval assembly comprises means for holding a ball.

25. The pinball machine of claim 20, wherein said ball retrieval assembly comprises means for retrieving and holding a plurality of balls.

26. The pinball machine of claim 20, wherein said ball retrieval assembly comprises means to retrieve the ball from a first location on said playfield, hold said ball, and then release said ball at a second location on said playfield.

* * * * *